Middle Years Assessment
Grade 7 Mathematics

Support Document for Teachers

English Program

MIDDLE YEARS ASSESSMENT: GRADE 7 MATHEMATICS

Support Document for Teachers

English Program

2006

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SECTION 1:
INTRODUCTION

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INTRODUCTION

Middle Years Assessment Policy Overview

Manitoba Education, Citizenship and Youth has developed a Middle Years Assessment Policy, published in *Middle Years Assessment of Key Competencies in Mathematics, Reading Comprehension, Expository Writing, and Student Engagement* (2006). It applies to all students in Grade 7 and Grade 8 in provincially funded schools. The primary purpose of the policy is to enhance student learning and engagement through classroom-based assessment processes that build student awareness and confidence in learning. Research shows that both the quality and level of academic achievement and student engagement can be increased through formative assessment (assessment *for* and *as* learning)*.

The second purpose of the policy is to summarize data and report on the levels of achievement in key areas that Middle Years students have attained by the end of January. These key areas are based on what most Manitobans regard as vital for all students: a reasonable level of reading, writing, number skills, and student engagement.

There are two distinct audiences for this summative assessment (assessment of learning). One is the learning team, which comprises the teacher, student, and parents**. Assessment information about each student reported in January can be used to plan the specific next steps in the student's learning and support the ongoing dialogue with parents. The second audience is the larger community—the school, school division, the Department, and the public—that can use the information to look for trends and make decisions about the provision of resources that further support and enhance student learning.

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* The terms "assessment for learning" and "assessment as learning" have recently entered the educational lexicon. These concepts can both be viewed as part of formative assessment. Assessment *for* learning refers to assessment processes that assist the teacher in planning and differentiating instruction, that provide feedback on teaching and learning, and that enhance student motivation and commitment to learning. Assessment *as* learning focuses on the student's thinking processes before, during, and after learning. Students reflect on their own learning and make adjustments in their thinking or behaviour to achieve deeper understanding. This self-regulation is critical in developing the independent, self-directed learning skills that students must acquire to thrive in the ever-changing world. For further information on formative and summative assessment, see the Manitoba Education, Citizenship and Youth document *Rethinking Classroom Assessment with Purpose in Mind: Assessment* for *Learning, Assessment* as *Learning, Assessment* of *Learning* (2006).

** In this document, the term "parents" refers to both parents and guardians, and is used with the recognition that in some cases only one parent may be involved in a child's education.

SECTION 2:
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CLASSROOM-BASED ASSESSMENT

Formative Assessment

The term "formative assessment" is not new, but its definition is changing based on research on how assessment enhances learning. When the term first became part of the language of educators in the 1960s, it referred to assessment that took place mostly after learning activities were completed, leading to adjustments to the teaching and learning process to redress areas of weakness.

With new research and increasing collaboration on assessment initiatives among international educational bodies, the definition has expanded. We now view formative assessment as information that is used to move learners forward and is gathered by the teacher and the student during, as well as after, the learning process. This external assessment *for* learning, done by the teacher, fosters an internal assessment *as* learning on the part of the student.

Research has found that the following strategies are most powerful when teachers use them to inform and adapt their instruction:

- clarifying and sharing learning intentions and criteria for success
- engineering effective classroom discussions, questions, and learning tasks
- providing feedback that moves learners forward
- activating students as the owners of their own learning
- activating students as instructional resources for one another (Leahy et al. 18)

The active engagement of students is an essential element of assessment that makes a positive difference in student learning. To become independent learners, students need to get an idea from the start of what is to be learned. Therefore, the teacher needs to explain the learning outcomes targeted, and have the students participate in

- setting criteria
- identifying performance indicators
- obtaining feedback from others (peers and teacher)
- further clarifying the criteria

Teachers model assessment of a performance or product against the established criteria for quality work. Students then practise comparing work to these established criteria by providing themselves and others with feedback as they reflect on their own work and the work of their peers.

Teachers further support students by helping them to revise their work and move it closer to the established criteria. Students accomplish this by using their own personal feedback, as well as feedback from their peers and teachers. Ultimately, through this modelling of practice, assessing against criteria, and using feedback to adjust understanding and performance, students learn not only to self-assess but also to

- understand the criteria better
- self-regulate their learning
- determine their next steps

These are critical steps in becoming independent, lifelong learners.

Summative Assessment

Summative assessment is part of regular classroom-based assessment and is designed to confirm how well students are meeting the targeted learning outcomes. This assessment of learning provides evidence of achievement to students, parents, other educators, and possibly to outside groups.

For the Middle Years assessment, individual reporting will be done for the student, the parents, and the Department.

Resources Supporting Classroom-Based Assessment

Allal, Linda, and Lucie Mottier Lopez. "Formative Assessment of Learning: A Review of Publications in French." *Formative Assessment: Improving Learning in Secondary Classrooms.* Paris, FR: OECD Publishing, 2005. 241-265.

Association for Supervision and Curriculum Development (ASCD). *Educational Leadership.* 63.3. Alexandria, VA: ASCD, November 2005.

Black, Paul, and Dylan Wiliam. "Changing Teaching through Formative Assessment: Research and Practice: The Kings-Medway-Oxfordshire." *Formative Assessment: Improving Learning in Secondary Classrooms.* Paris, FR: OECD Publishing, 2005. 223-240.

---. "Inside the Black Box: Raising Standards through Classroom Assessment." *Phi Delta Kappan* (October 1998): 139-147.

Boyd-Batstone, Paul. "Focused Anecdotal Records Assessment: A Tool for Standards-Based, Authentic Assessment." *The Reading Teacher* 58.3 (November 2004): 230-239.

Davies, Anne. *Making Classroom Assessment Work.* Merville, BC: Classroom Connections International, 2000.

Earl, Lorna. *Assessment As Learning: Using Classroom Assessment to Maximize Student Learning.* Thousand Oaks, CA: Corwin Press, 2003.

Gregory, Kathleen, Caren Cameron, and Anne Davies. *Conferencing and Reporting.* Merville, BC: Connections Publishing, 1997.

---. *Self-Assessment and Goal Setting.* Merville, BC: Connections Publishing, 1997.

---. *Setting and Using Criteria.* Merville, BC: Connections Publishing, 1997.

Manitoba Education, Citizenship and Youth. *Middle Years Assessment of Key Competencies in Mathematics, Reading Comprehension, Expository Writing, and Student Engagement.* Winnipeg, MB: Manitoba Education, Citizenship and Youth, 2006.

---. *Reporting on Key Competencies in Mathematics, Reading Comprehension, Expository Writing, and Student Engagement with School in the Middle Years.* Winnipeg, MB: Manitoba Education, Citizenship and Youth, 2005.

---. *Rethinking Classroom Assessment with Purpose in Mind: Assessment* for *Learning, Assessment* as *Learning, Assessment* of *Learning*. Winnipeg, MB: Manitoba Education, Citizenship and Youth, 2006.

Organisation for Economic Co-operation and Development (OECD). *Formative Assessment: Improving Learning in Secondary Classrooms*. Paris, FR: OECD Publishing, 2005.

Stiggins, R., Judith Arter, Jan Chappuis, and Stephen Chappuis. *Classroom Assessment for Student Learning*. Portland, OR: Assessment Training Institute, 2004.

Sutton, Ruth. *Assessment For Learning*. Salford, UK: RS Publications, 1995.

Wiggins, Grant P. *Assessing Student Performance*. San Francisco, CA: Jossey Bass Inc., 1993.

---. *Educative Assessment: Designing Assessments to Inform and Improve Student Performance*. San Francisco, CA: Jossey Bass Inc., 1998.

Wiggins, Grant P., and Jay McTighe. *Understanding by Design*. San Francisco, CA: Prentice-Hall, Inc., 1998.

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GRADE 7 MATHEMATICS

Rationale for the Selection of Key Competencies in Mathematics

Number Sense and Number Skills are two aspects of the mathematics curriculum that are increasingly fundamental to ongoing success in school and in society.

Number Sense

In our rapidly-changing and increasingly technological society, making sense of numbers and solving problems have become more important than simply performing operations on numbers.

The specific Number Sense competencies being assessed as part of this policy include comparing and ordering fractions, decimals and numbers expressed in different ways.

- Students need to develop mental images to represent numbers in order to facilitate their comparison.
- As students acquire new number concepts, they need to make sense of the numbers by becoming aware of the relationships found in numbers and the structure of the number system.
- Students need to develop an understanding of different ways in which numbers are expressed; they also need to be able to compare their value relative **to one another**.

Number Skills

The study of patterns is fundamental to the study of mathematics and developing skills with numbers. Students need to observe patterns, speculate about them, discuss these speculations, and make generalizations. Through patterns, students discover relationships and develop understandings about mathematics. The knowledge and understanding of patterns and relations prepare students to understand and work with algebra and functions in the Senior Years.

Today's math learners also need mental math skills. Being able to obtain exact answers for numerically simple problems and arithmetic tasks without using paper and pencil or technology is now a necessary skill for students.

The specific Number Skills competencies assessed as part of this policy include Patterns and Mental Math.

Patterns

Students can:

- represent, recognize, construct and extend patterns, and develop charts or tables to record and extend patterns
- model patterns on graphs and describe, in everyday language, a rule to reflect and extend patterns, and write an algebraic equation for number patterns to solve problems

Mental Math

Students can:

- demonstrate an understanding of the part-part-whole and place value concepts
- apply properties of the number system and choose the most appropriate mental strategy for specific numbers involved in a given problem

This section of the document provides information about and tools for assisting educators in completing the Provincial Reports on Student Performance in Grade 7 Mathematics. These tools include:

- samples of reporting templates
- exemplars of student work demonstrating various levels of performance in tasks designed to help students meet identified competencies in Number Sense and Number Skills
- suggested resources and sample strategies and tools for supporting the development of competencies in the Grade 7 classroom

Provincial Reports on Student Performance

In Grade 7 Mathematics, the Provincial Reports on Student Performance include the following information:

- competencies for both Number Sense and Number Skills, which are the same in the English, French Immersion, and Français Programs
- three levels of performance: not meeting, approaching, and meeting
- criteria for each level of performance

A sample of the reporting template is provided on the following pages for the English Program. Teachers and students have an opportunity to comment on the reports in the space provided at the bottom of the reporting templates. This option permits teachers to add comments if circumstances warrant. It also allows students to reflect on the first half of the school year and to set goals for the second half. As a result, the summative information on the report can be used for the formative purpose of improving student performance, not only for evaluating it.

Reporting Template

English Program
January 20___

Provincial Report on Student Performance
Grade 7
Mathematics

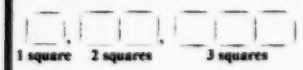
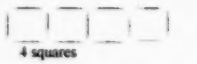
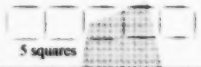
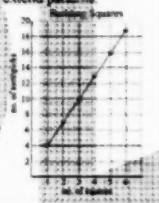
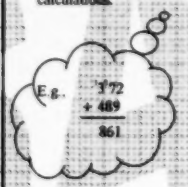
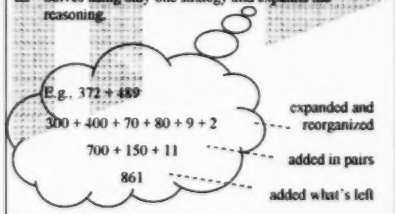
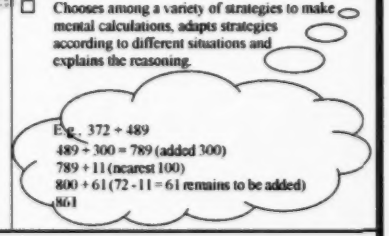
Student Name:_____
☐ Individual Education Plan (IEP)

Competency	Levels of Performance		
Number Sense **Student has a conceptual understanding of number and of some of its representations.**	**Not Meeting** **Mid-Grade 7 Level of Performance**	**Approaching** **Mid-Grade 7 Level of Performance**	**Meeting** **Mid-Grade 7 Level of Performance**
Student orders fractions.	☐ Orders fractions using pictures. E.g.,	☐ Connects picture representations of fractions to their symbols to order them. E.g., $\frac{1}{4}$ $\frac{1}{5}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{5}{3}$	☐ Orders fractions in symbols. E.g., $\frac{1}{4}, \frac{1}{2}, \frac{7}{5}, 1\frac{1}{2}, \frac{11}{3}, 3\frac{3}{4}$
Student orders decimal numbers.	☐ Orders decimal numbers between 0 and 1, to three decimal places. E.g., 0.035, 0.305, 0.350	☐ Orders decimal numbers greater than 1, to three decimal places. E.g., 1.224, 1.334	☐ Orders numbers to any number of decimal places. E.g., 0.003 456, 0.034 004, 1.003 456
Student understands that a given number may be represented in a variety of ways. **[Representations: pictorial, fraction, decimal, percent, ratio]**	☐ Represents a given number in one other way. E.g., $\frac{1}{2} =$	☐ Represents a given number in two other ways. E.g., $\frac{1}{3} = 0.333...$ and $33\frac{1}{3}\%$	☐ Represents a given number in more than two other ways. E.g., $\frac{1}{4} = 0.25 = 25\% = 1:4 =$

continued...

SAMPLE

Reporting Template

Competency	Levels of Performance		
Number Skills **Student solves mathematical problems using knowledge of number patterns and mental math strategies.**	**Not Meeting** **Mid-Grade 7 Level of Performance**	**Approaching** **Mid-Grade 7 Level of Performance**	**Meeting** **Mid-Grade 7 Level of Performance**
Student uses number patterns to solve mathematical problems. **E.g., Toothpicks are used to build squares as shown below.**  **1 square 2 squares 3 squares** **How many toothpicks are needed to build 51 squares?**	☐ In a problem-solving context, represents, recognizes, constructs, and extends patterns; uses materials, pictures or numbers; develops a chart or table to record and extend patterns. E.g.,  4 squares  5 squares no. of squares / no. of toothpicks 1 / 4 2 / 7 3 / 10 4 / 13 5 / 16 6 / 19	☐ Models patterns on graphs and describes (in everyday language) a rule to reflect and extend patterns. E.g., Add three toothpicks to form the next square. or You start with 1 toothpick and add 3 for every square.  	☐ Writes an algebraic equation for number patterns to solve problems. E.g., Let n = number of squares and t = number of toothpicks $t = 3n + 1$ $t = 3(51) + 1$ $t = 153 + 1$ $t = 154$
Student uses a variety of strategies to calculate and explain a mental math problem. **E.g., Add 372 + 489.** **[Strategies such as skip counting, decomposition and regrouping (associative property), compatible numbers, starting from known facts, compensation, using the opposite operation, place value, commutative property, distributive property]**	☐ Uses paper and pencil methods to make mental calculations.  E.g., 372 + 489 861	☐ Solves using only one strategy and explains the reasoning.  E.g., 372 + 489 300 + 400 + 70 + 80 + 9 + 2 — expanded and reorganized 700 + 150 + 11 — added in pairs 861 — added what's left	☐ Chooses among a variety of strategies to make mental calculations, adapts strategies according to different situations and explains the reasoning.  E.g., 372 + 489 489 + 300 = 789 (added 300) 789 + 11 (nearest 100) 800 + 61 (72 - 11 = 61 remains to be added) 861
Comments (optional) **Teacher Signature:** _____		**Student Reflections and Goals (optional)**	

Manitoba

Exemplars of Student Work

Exemplars of student work are provided on the following pages to help teachers complete the Provincial Report on Student Performance in Grade 7 Mathematics. The exemplars are intended to help ensure that teachers across the province are using the same standards and that student performance data are reliable. They may also be used with students as models and with parents to help them understand the Middle Years Assessment Policy.

The exemplars in this document are intended only to illustrate the competencies and specific levels of performance outlined in the Provincial Report on Student Performance.

A wide variety of classroom activities are to be used to collect evidence, over time, of student growth in these competencies. The exemplars were generated as students participated in specific classroom activities. However, it is not intended that these activities be replicated by others in order to collect samples of student performance.

Exemplars representing the three levels of performance (not meeting, approaching, and meeting) are provided for each competency identified on the Provincial Report on Student Performance:

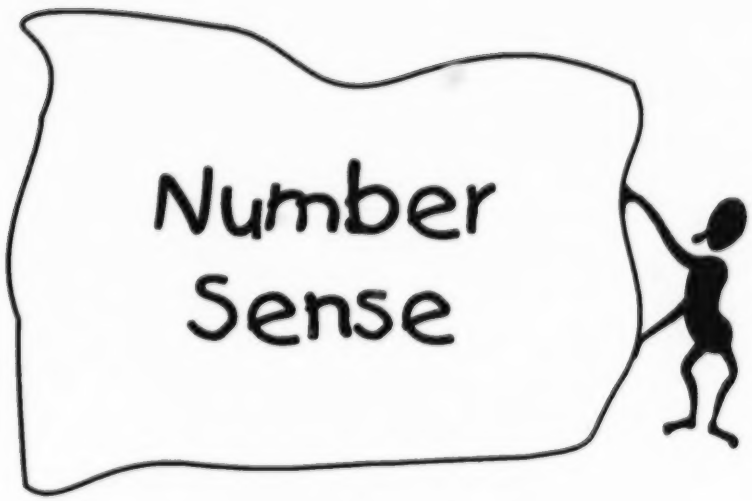
- **Number Sense**: The exemplars for specific competencies related to this competency are:
  - — Ordering Fractions
  - — Ordering Decimals
  - — Representing Numbers
- **Number Skills**: The exemplars for specific competencies related to this competency are:
  - — Patterns
  - — Mental Math

Each exemplar includes the following components:

- **Competency:** A specific competency is identified for each exemplar.
- **Description of the Task:** The specific task assigned to the student provides a context for the exemplar.
- **Exemplar:** The actual representation of student work demonstrates a specific level of performance: not meeting, approaching, or meeting.
- **Rationale for Assigned Level:** Notes on why the sample was assessed at a particular level of performance are recorded here. These points are thoughts a teacher might jot down about the student's work; they are not meant to be prescriptive or complete.
- **Possible Next Steps:** Ideas or thoughts on potential strategies or tools that the teacher or student may employ to improve the student's future performance are noted here.

Suggestions to guide the collection of evidence of student progress related to a specific skill or concept:

- Focus on one specific skill or concept at a time, as opposed to compiling a number of skills and concepts in a quiz or test form. This focus allows the teacher to more readily understand and assess students' levels of performance, as well as to have a clearer idea of areas that need to be addressed in order for further growth to take place.
- Frequently use rich tasks that allow students to fully demonstrate their level of skill or understanding. These tasks may also allow students to effectively demonstrate more than one skill or concept.


Number
Sense

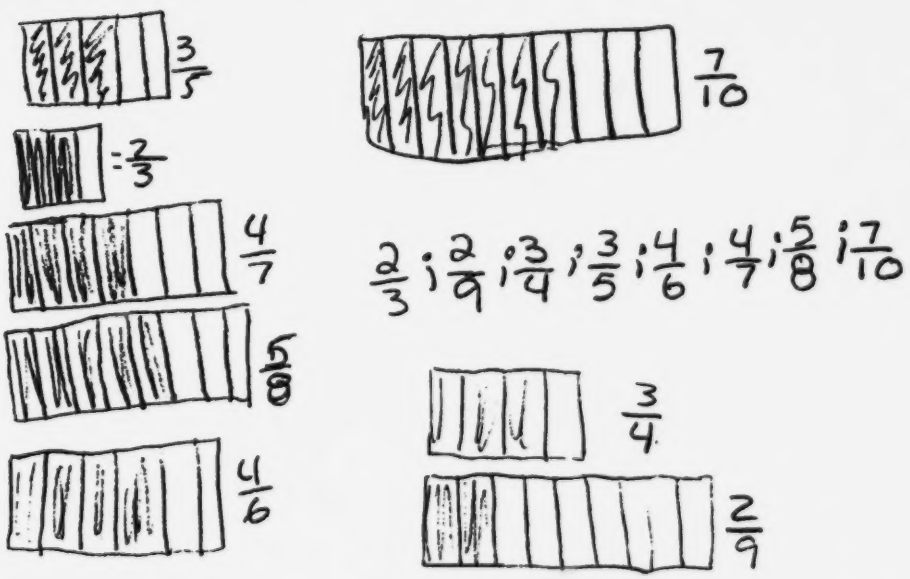
Exemplar 1 of 3

Competency: Student orders fractions.

Description of the Task: Place the following fractions in increasing order. Explain or show your work. (Explain why you have chosen to place the fractions in that order.)

$\frac{3}{5}$	$\frac{2}{3}$	$\frac{4}{7}$	$\frac{5}{8}$	$\frac{4}{6}$	$\frac{3}{4}$	$\frac{2}{9}$	$\frac{7}{10}$

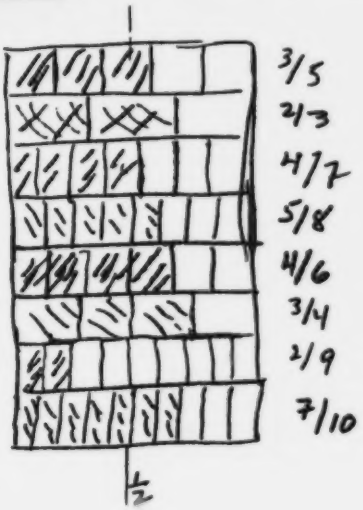
Not Meeting MID-GRADE 7 LEVEL OF PERFORMANCE



Rationale for Assigned Level: Within the rectangles, parts are not divided into equal sizes. The fractions shown are based on wholes of different sizes.

Possible Next Steps: Work with the student to clarify that fractions can only be compared if they are parts representing the same size whole. Explain that when dividing a rectangle into parts, each part must be of the same size.

Approaching MID-GRADE 7 LEVEL OF PERFORMANCE



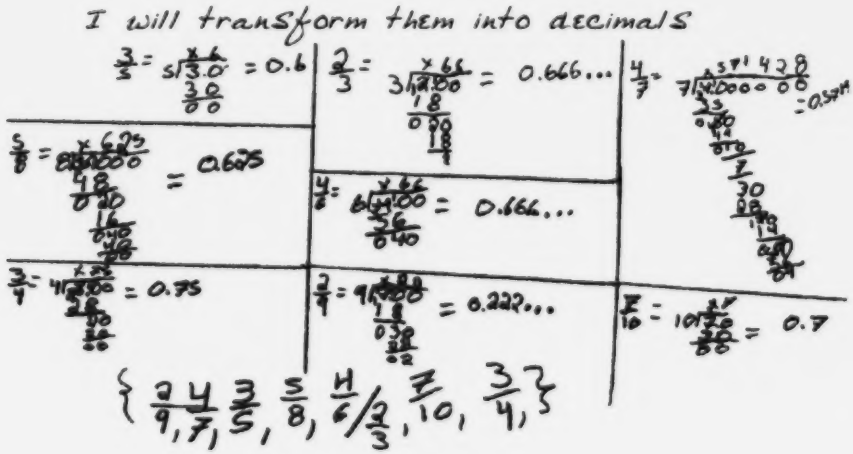
2/3

$\frac{2}{9}, \frac{4}{7}, \frac{3}{5}, \frac{5}{8}, \frac{4}{6}, \frac{7}{10}, \frac{3}{4}$

Rationale for Assigned Level: Needs pictures to compare size.

Possible Next Steps: Demonstrate other strategies for comparing fractions.

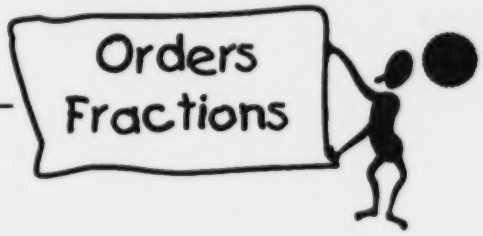
Meeting MID-GRADE 7 LEVEL OF PERFORMANCE



Rationale for Assigned Level: Uses an effective strategy. Correct answer.

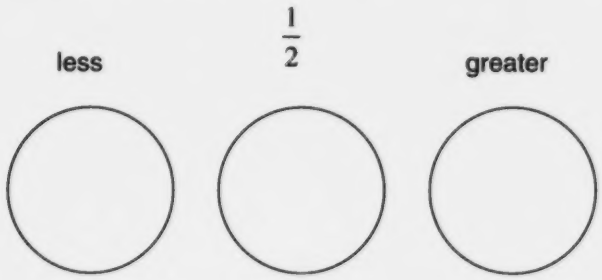
Possible Next Steps: Demonstrate other strategies within the same question.

Exemplar 2 of 3



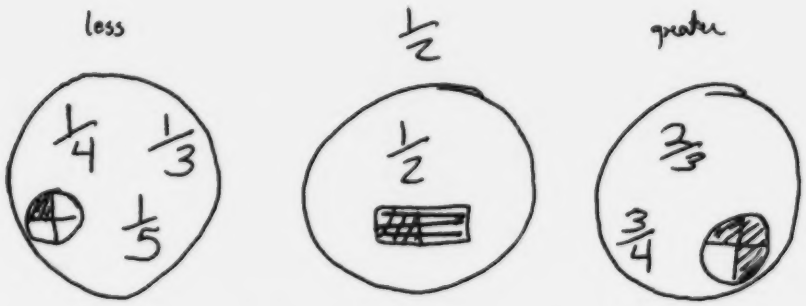
Competency: Student orders fractions.

Description of the Task: Show what you know about fractions, decimals, and percents by completing the following diagram. You may use pictures, words, symbols, or numerals.



Note: It is not the number of examples the student gives but the depth of understanding they demonstrate that will determine in which level they are scored.

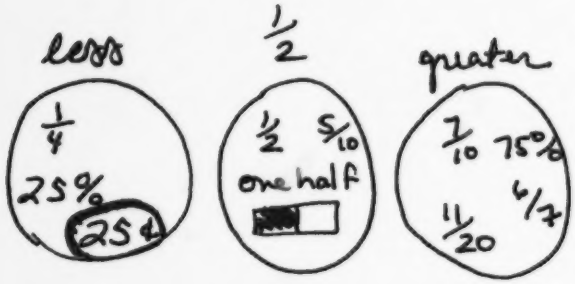
Not Meeting **MID-GRADE 7 LEVEL OF PERFORMANCE**



Rationale for Assigned Level: Only uses unitary and common fractions.

Possible Next Steps: Work with the student on other representations like decimals and percents and their connections to fractions, including numbers greater than 1. Ask questions to determine if student understands that fractions can be greater than 1.

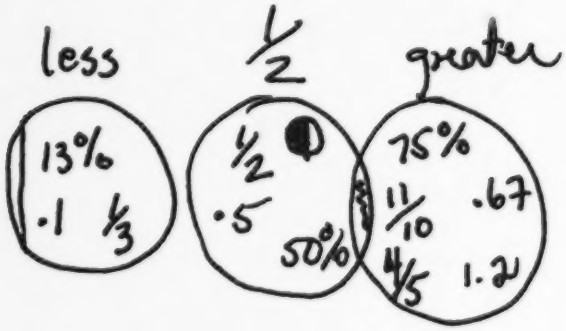
Approaching MID-GRADE 7 LEVEL OF PERFORMANCE



Rationale for Assigned Level: Multiple representations of unitary fractions. No decimals.

Possible Next Steps: Ask questions to determine if student understands that fractions can be greater than 1 and can be expressed as mixed numbers and improper fractions. Introduce decimals and their relationships to fractions and percent.

Meeting MID-GRADE 7 LEVEL OF PERFORMANCE



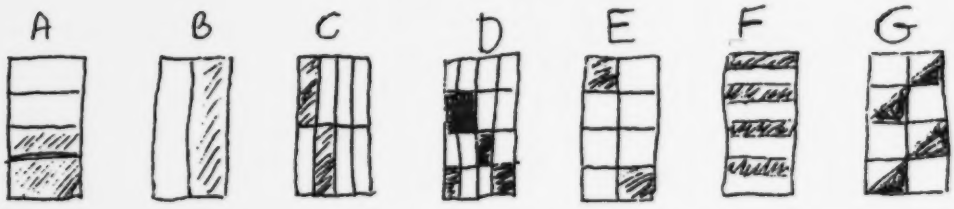
Rationale for Assigned Level: Variety of representations. Representations include fractions, decimals, percentages, and pictures. Improper fractions included.

Possible Next Steps: Introduce or review representations of repeating decimals. Review correct written form of decimals (i.e., 0.1). Review mixed numbers.

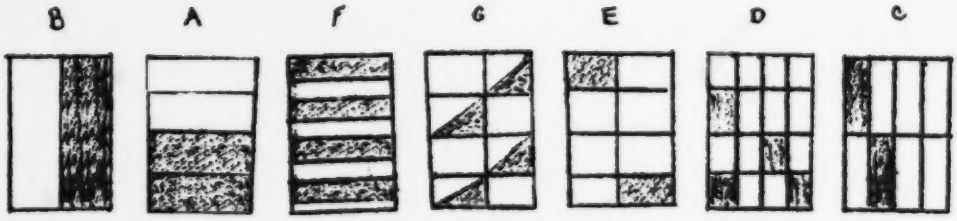
Exemplar 3 of 3

Competency: Student orders fractions.

Description of the Task: Place the fractions represented in the following pictures in increasing order.



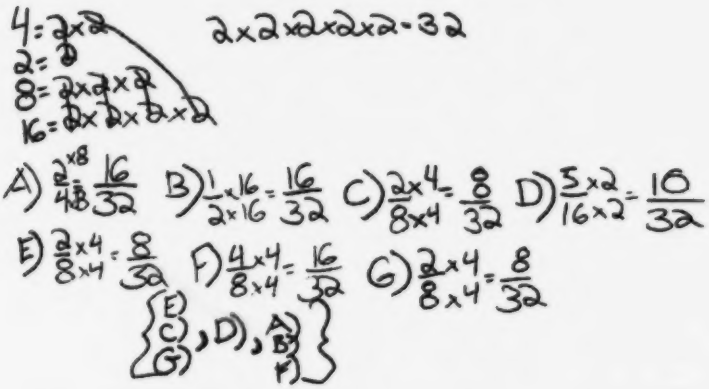
Not Meeting **MID-GRADE 7 LEVEL OF PERFORMANCE**



Rationale for Assigned Level: Decreasing order. Does not demonstrate an understanding of equivalent fractions.

Possible Next Steps: Link pictures of equivalent fractions to manipulative equivalent fractions. Link pictures to symbolic representation of fractions.

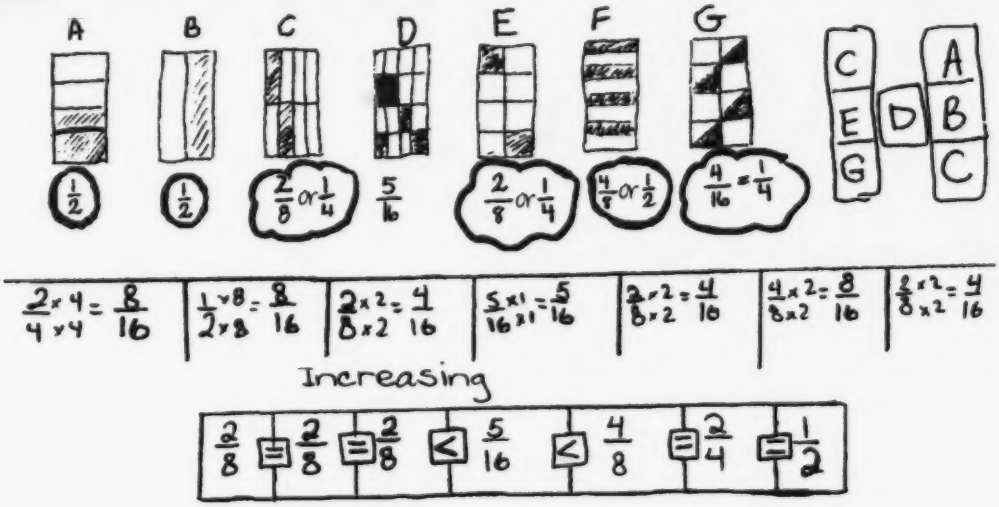
Approaching MID-GRADE 7 LEVEL OF PERFORMANCE



Rationale for Assigned Level: Correctly ordered. Laborious methodology in determining a common denominator.

Possible Next Steps: Review expressing fractions in lowest terms. Demonstrate and discuss other strategies for determining the order.

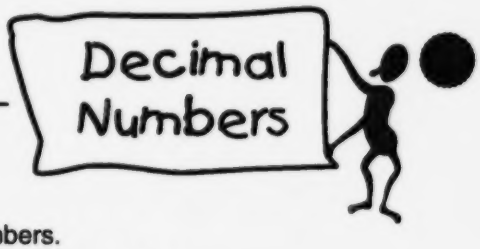
Meeting MID-GRADE 7 LEVEL OF PERFORMANCE



Rationale for Assigned Level: Correctly ordered. Fractions in lowest terms. LCD.

Possible Next Steps: Discuss strategies for ordering mixed and improper fractions.

Exemplar 1 of 1



Competency: Student orders decimal numbers.

Description of the Task: Place the following decimals in increasing order.

0.034	0.304	0.0034	1.034 002
1.340	0.403 000 5	1.034 004	1.034 05

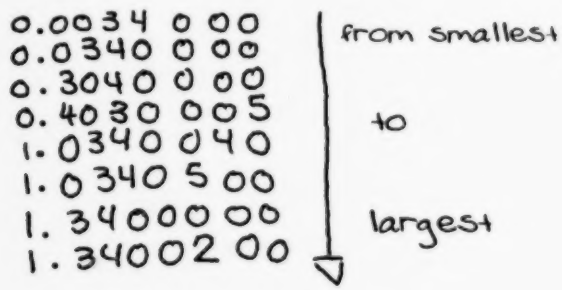
Not Meeting **MID-GRADE 7 LEVEL OF PERFORMANCE**

0.0034 < 0.034 < 0.304 < 0.4030005
< 1.304002 < 1.340 < 1.03405 <
1.03405

Rationale for Assigned Level: Can compare numbers between 0 and 1 only. Errors in transcribing numbers.

Possible Next Steps: Understand the whole.

Approaching MID-GRADE 7 LEVEL OF PERFORMANCE



Rationale for Assigned Level: Adds zeroes to make the same number of positions for comparing.

Possible Next Steps: Compare numbers without adding the extra zeroes.

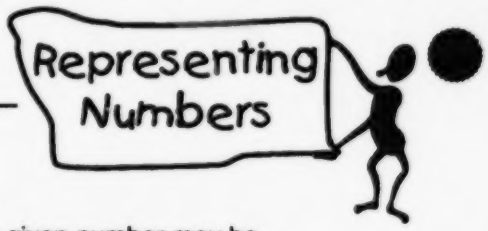
Meeting MID-GRADE 7 LEVEL OF PERFORMANCE

0.0034 < 0.034 < 0.304 < 0.4030005
< 1.034 002 < 1.034 004 < 1.0340S < 1.340

Rationale for Assigned Level: Able to order numbers correctly.

Possible Next Steps: Show how order was arrived at.

Exemplar 1 of 3

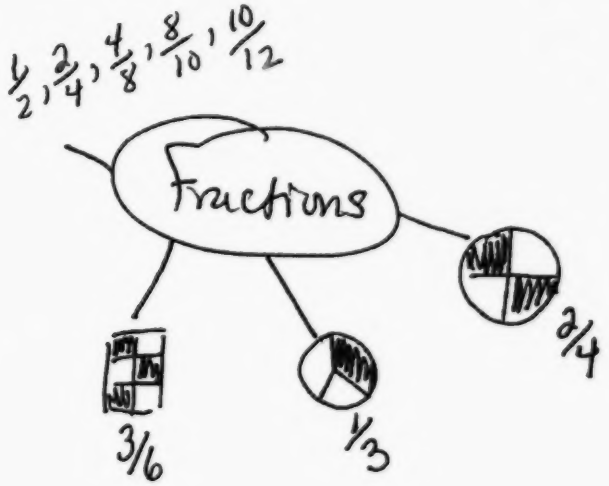


Competency: Student understands that a given number may be represented in a variety of ways.

Description of the Task: Students are given a page with the word "fractions" written in the centre. The instructions are: "Write everything you know about fractions on this page."

This is a good activity to assess what students know about fractions as an entry point. Although students are not specifically asked to represent numbers in a variety of ways, information on this competency can be gleaned from the student work. This activity will allow a teacher to gain information about student understanding of a variety of concepts. Students can place this activity into their portfolio and revisit it after studying fractions to add new understanding and correct misconceptions. This will allow students to see their growth during the school year.

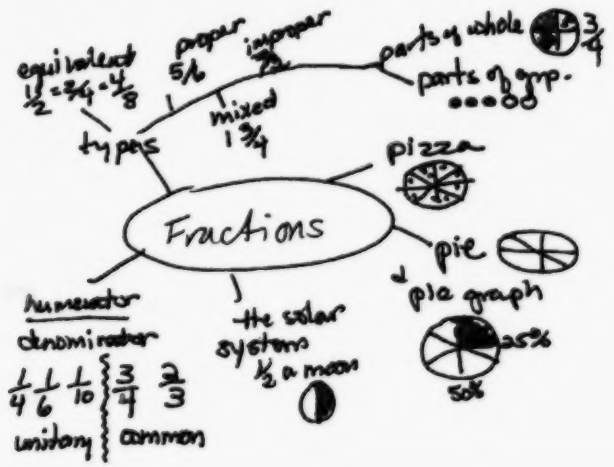
Not Meeting MID-GRADE 7 LEVEL OF PERFORMANCE



Rationale for Assigned Level: Set model knowledge not demonstrated. May understand equivalency but doesn't demonstrate understanding for fractions other than ½. Models whole with discs and tiles.

Possible Next Steps: Introduce terms numerator and denominator. Ask directed questions to determine the level of student understanding more precisely.

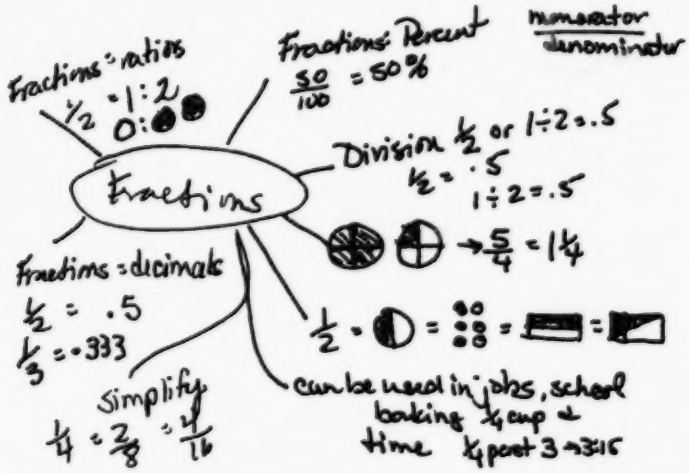
Approaching MID-GRADE 7 LEVEL OF PERFORMANCE



Rationale for Assigned Level: Understands many types of fractions. No connections to decimals. Solid on circular representations but does not use rectangular representations.

Possible Next Steps: Represent fractions as ratios. Model fraction part of whole in other than circular setting. Continue to model fraction of a set.

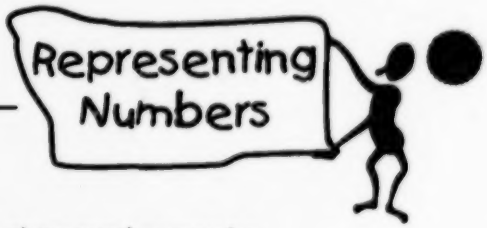
Meeting MID-GRADE 7 LEVEL OF PERFORMANCE



Rationale for Assigned Level: Has multiple representations. Knows improper fractions. Shows set model, ratio, percent, part/whole, and connects to real world. Shows mixed numerals.

Possible Next Steps: Clarify correct recording of decimals (i.e., .5 → 0.5). Determine if students can show multiple representations with other fractions than ½ consistently.

Exemplar 2 of 3

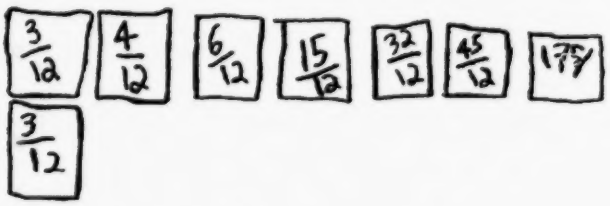


Competency: Student understands that a given number may be represented in a variety of ways.

Description of the Task: Place the fractions represented in the following numbers in increasing order.

$\frac{5}{4}$, $2\frac{2}{3}$, 1.4, $\frac{3}{6}$, 25%, $\frac{15}{4}$, 175%

Not Meeting MID-GRADE 7 LEVEL OF PERFORMANCE



$\frac{5}{4} \times 3 = \frac{15}{12}$

$\frac{2}{3}$ $2 \times 3 + 2 = 8$ $\times 4 = \frac{32}{12}$

$1.4 - \frac{1}{4} \times 3 = \frac{3}{12}$

$\frac{3}{6} \times 2 = \frac{6}{12}$

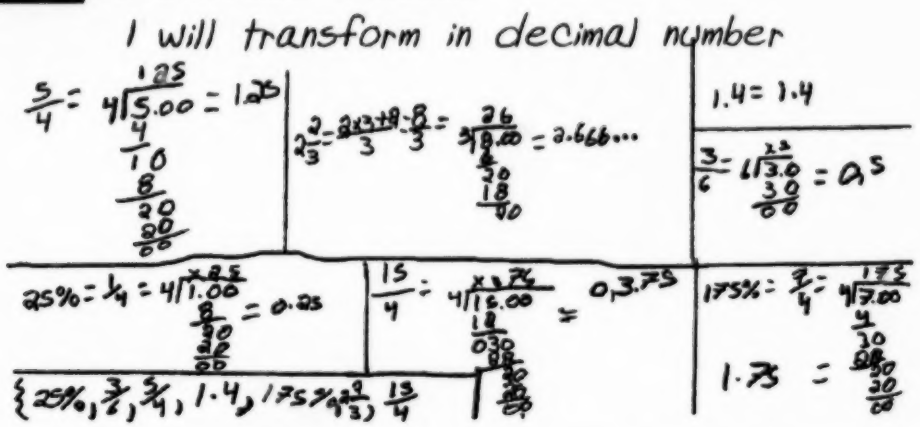
$25\% - \frac{1}{4} \times 3 = \frac{3}{12}$

$\frac{15}{\blacksquare} \times 3 = \frac{45}{12}$ 175%

Rationale for Assigned Level: Converts certain numbers.

Possible Next Steps: Convert decimals to fractions or percents.

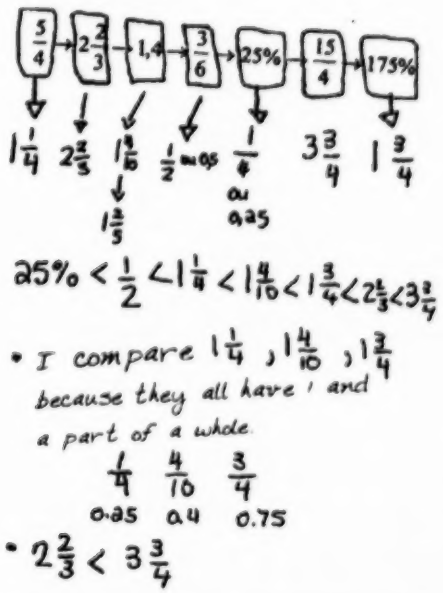
Approaching MID-GRADE 7 LEVEL OF PERFORMANCE



Rationale for Assigned Level: Correct order but uses only one strategy.

Possible Next Steps: Referents; using different strategies in the same problem. Showing work does not mean giving a written description of the same strategy.

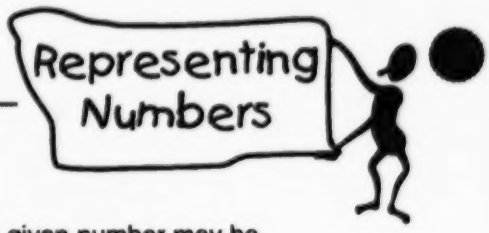
Meeting MID-GRADE 7 LEVEL OF PERFORMANCE



Rationale for Assigned Level: Uses units to organize fractions into subsets; converts fractions to decimals to order them.

Possible Next Steps: Determine whether the student can order fractions without converting them to decimals.

Exemplar 3 of 3



Competency: Student understands that a given number may be represented in a variety of ways.

Description of the Task: Use the three-point approach to assess student understanding of vocabulary. Give words such as unitary or common fraction, decimal, percent, mixed number, and improper fraction. This example is for improper fractions.

Not Meeting **MID-GRADE 7 LEVEL OF PERFORMANCE**

Word	Definition	Illustration
Improper Fraction	numerator bigger than dinominator	
Example		
$\frac{3}{2}$		

Rationale for Assigned Level: Limited conceptual understanding. Unable to illustrate.

Possible Next Steps: Understanding that improper fractions are greater than 1.

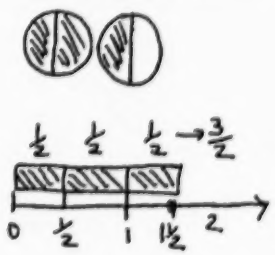
Approaching MID-GRADE 7 LEVEL OF PERFORMANCE

Word	Definition	Illustration
Improper Fraction	a fraction that is larger than 1	
Example		
$\frac{3}{2}$		

Rationale for Assigned Level: Simple understanding of picture representation.

Possible Next Steps: Clarify drawing of improper fractions. Multiple representations.

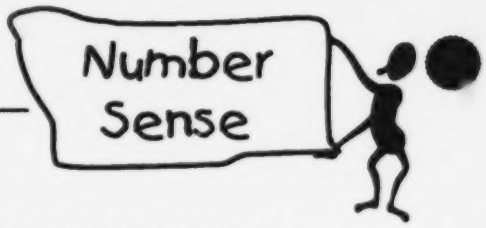
Meeting MID-GRADE 7 LEVEL OF PERFORMANCE

Word	Definition	Illustration
Improper Fraction	A fraction in which the numerator is larger than the denominator. Always larger than 1. Can be represented as a mixed number.	
Example		
three halves $\frac{3}{2}$		

Rationale for Assigned Level: Thorough understanding. Sees improper fraction as mixed numbers.

Possible Next Steps: Extend to decimals.

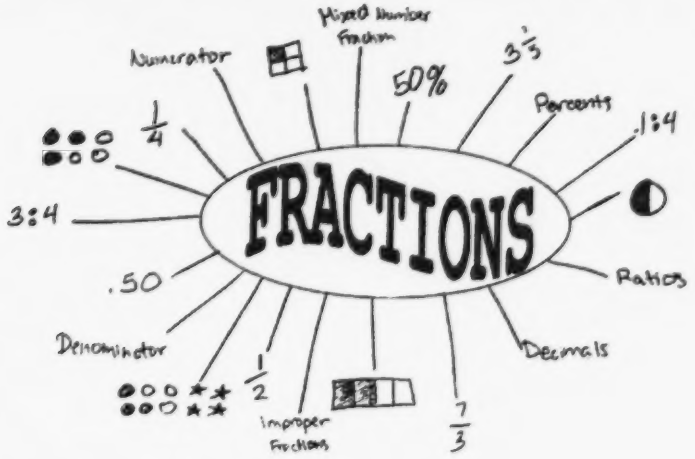
Exemplar 1



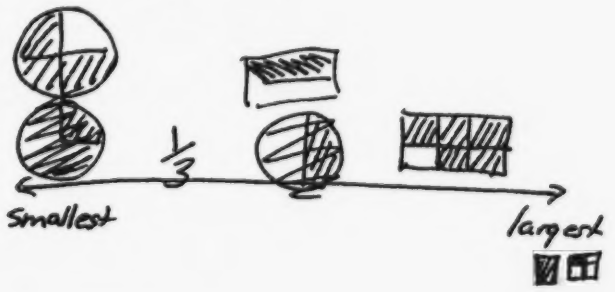
Some questions may yield information relative to more than one competency. Here is an example of one such question:

Competency: Student orders fractions. Student orders decimals. Student understands that a given number may be represented in a variety of ways.

Description of the Task: Choose at least five representations from the examples below. Place in order from smallest to greatest value.



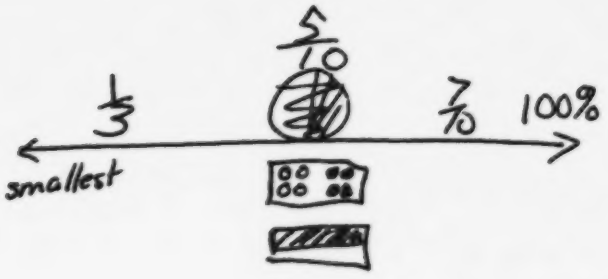
Not Meeting MID-GRADE 7 LEVEL OF PERFORMANCE



Rationale for Assigned Level: Chooses pictorial representations and symbolic representation. Has error in order.

Possible Next Steps: Encourage student to recognize and use multiple representations. Verify student's understanding of instructions.

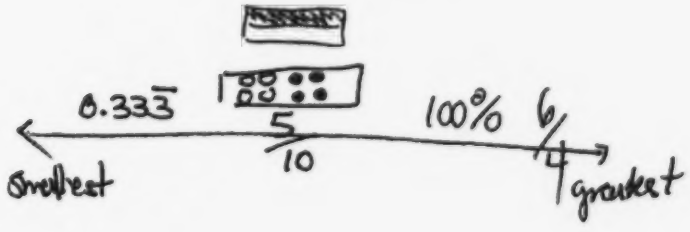
Approaching MID-GRADE 7 LEVEL OF PERFORMANCE



Rationale for Assigned Level: Demonstrates equivalency of ½. Chooses unitary or common fractions.

Possible Next Steps: Verify that student understands decimal and percent representations. Model representations greater than 1.

Meeting MID-GRADE 7 LEVEL OF PERFORMANCE

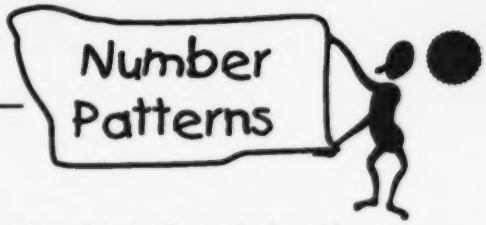


Rationale for Assigned Level: Uses multiple representations. Represents numbers greater than 1. Uses more than five examples.

Possible Next Steps: Allow student to explore mental math strategies for relating fractions, decimals, and percentage.

Number
Skills

Exemplar 1 of 2



Competency: Student uses number patterns to solve mathematical problems.

Description of the Task: What is the number of chips needed to construct the 15th term of this pattern?

a) Draw the 4th and 5th terms.
b) Construct a table.
c) Construct a graph for the pattern.
d) Describe the pattern.
e) Use an equation to find the 15th term.

Term 1:	Term 2:	Term 3:
O	OO	OOO
OO	OOO	OOOO

Not Meeting **MID-GRADE 7 LEVEL OF PERFORMANCE**

Term 4
OOOO
OOOOO

Term 5
OOOOO
OOOOOO

Term number	Number of chips
1	3
2	5
3	7
4	9
5	11
6	13
7	15
8	17
9	19
10	21
11	23
12	25
13	27
14	29
15	31

Rationale for Assigned Level: Extends the table to the 15th term to answer the question; does not complete task.

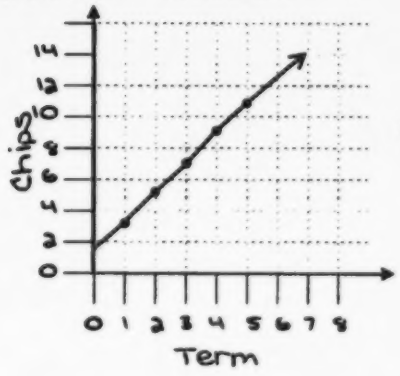
Possible Next Steps: Verify that student understands how to ask questions to determine if she/he can graph the pattern. Determine if the student can verbalize the rule and then use the equation to find the nth term of a pattern. Provide opportunities for student to build patterns and verbalize the rule.

Approaching MID-GRADE 7 LEVEL OF PERFORMANCE

Term 4
0 0 0 0
0 0 0 0 0

Term 5
0 0 0 0 0
0 0 0 0 0 0

I multiply by 2 and add 1
2.15 + 1 = 31



Number of chips required for each term.

Term	Chips
1 x 2 + 1	3
2 x 2 + 1	5
3 x 2 + 1	7
4	9
5	11
6	13
7	15
8	17
9	19
10	21

Rationale for Assigned Level: Can find the rule and expresses it in words but cannot write the corresponding algebraic equation.

Possible Next Steps: Discuss how to change the rule into an algebraic equation.

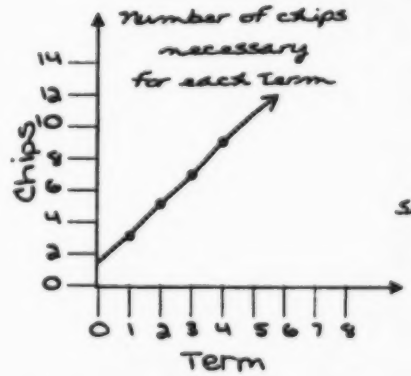
Meeting MID-GRADE 7 LEVEL OF PERFORMANCE

Term 4
0 0 0 0
0 0 0 0 0

Term 5
0 0 0 0 0
0 0 0 0 0 0

When the term (T) increases by 1, the number of chips (c) increases by 2. I have to double the number of the term and add 1.

Term Number	Number of Chips
1	3
2	5
3	7
4	9
5	11



If T = Term
c = chips

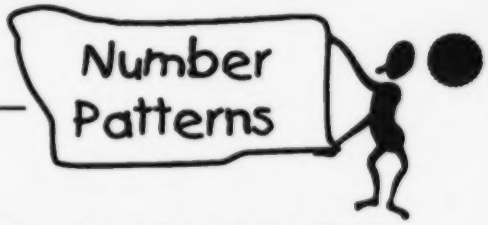
2T + 1 = c equation

Since 2T + 1 = c
2(15) + 1 = c
30 + 1 = c
31 = c T = 15

Rationale for Assigned Level: Finds the nth term without needing a drawing or a chart and expresses the rule algebraically.

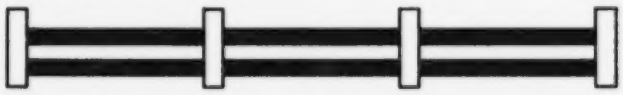
Possible Next Steps: Provide opportunities to use these skills to solve problems.

Exemplar 2 of 2



Competency: Student uses number patterns to solve mathematical problems.

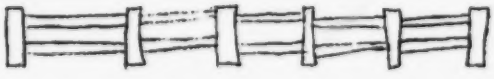
Description of the Task: To construct a fence, Claudia has used posts connected with two boards.



a) Extend Claudia's fence by adding two more posts and the necessary boards.
b) Construct a table to show the relation between the number of posts and the number of boards.
c) Predict the number of boards she will need to construct a fence with 10 posts, with 100 posts. Explain, in your own words, how you got your answers.
d) Draw a graph to show the relation between the number of posts and the number of boards.
e) Find an algebraic equation that will allow you to find the number of boards needed to construct a fence having any number of posts.

Not Meeting MID-GRADE 7 LEVEL OF PERFORMANCE

a)



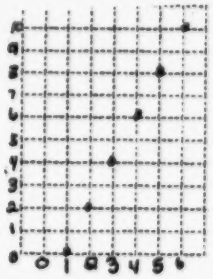
b)

Posts	Boards
1	0
2	1
3	2
4	3
5	4
6	5
	6
	7
	8
	9
	10

c) add 2 to the number of posts you have to get the number of boards

19-18 100 99

d)

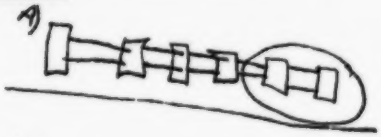


Rationale for Assigned Level: Table has incorrect values for problem. The graph is labelled incorrectly (i.e., two origins). Algebraic equation for the pattern is missing.

Possible Next Steps: Review how to construct a graph. Discuss how to translate words into algebraic equations.

Approaching **MID-GRADE 7 LEVEL OF PERFORMANCE**

A)

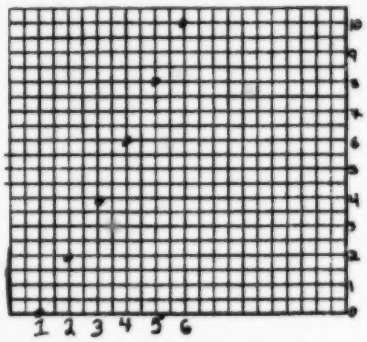


C) For 8 posts, there are 18 boards. In my head, I think 100 posts would have 108.

B)

Posts	Boards
1	0
2	2
3	4
4	6
5	8
6	10
7	12
8	14
9	16
10	18

D)



E) $(B-1) \times 2 = P$

P = posts
B = boards

Rationale for Assigned Level: Graph is not labelled. Error in finding number of boards.

Possible Next Steps: Review how to label a graph. Encourage student to check answers for accuracy.

Meeting **MID-GRADE 7 LEVEL OF PERFORMANCE**

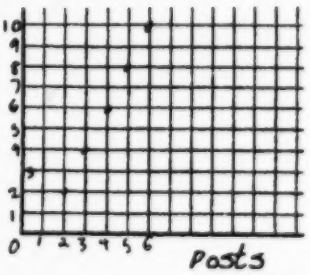
a)

C. 18, 198 I have multiplied the number of boards by 2 and then subtracted 2 to get the number of boards.

b)

Posts	Boards
1	0
2	2
3	4
4	6
5	8
6	10

d)



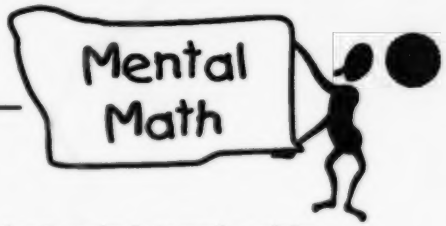
e) $2a - 2 = b$

P = Posts
B = Boards

Rationale for Assigned Level: The pattern is continued. The table is complete. The rule is described in words and algebraically. The graph represents the pattern. An equation is used to find the nth term.

Possible Next Steps: Review correct labelling/titling of graph. Challenge student with more complex problems.

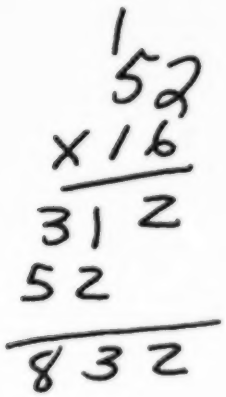
Exemplar 1 of 2



Competency: Student uses a variety of strategies to calculate and explain a mental math problem.

Description of the Task: Explain how to mentally calculate 16 × 52 in two different ways.

Not Meeting **MID-GRADE 7 LEVEL OF PERFORMANCE**



Rationale for Assigned Level: Resorts to procedural algorithm.

Possible Next Steps: Model a variety of mental math strategies and provide opportunities for the student to use them.

Approaching **MID-GRADE 7 LEVEL OF PERFORMANCE**

16 x 52

10 x 50 = 500
10 x 2 = 20
6 x 50 = 300
2 x 6 = 12

500 + 300 + 20 + 12
800 32
832

Rationale for Assigned Level: One strategy. No explanation.

Possible Next Steps: Model explanations of mental math strategies. Demonstrate a variety of strategies.

Meeting **MID-GRADE 7 LEVEL OF PERFORMANCE**

16 x 52 =

I used friendly #'s + partitioning

I know 100 x 16 = 1600
50 is ½ of 100 so 1600 ÷ 2 = 800
add 2 more sets of 16 is 32
800 + 32 = 832

I can solve a 2nd way

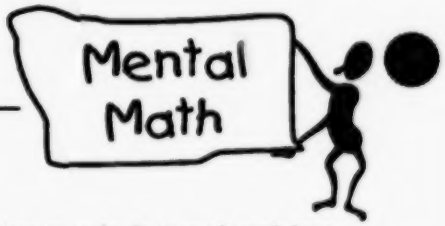
16 x 52 =
8 x 104
4 x 208
2 x 416 → 832

I used double + halving strategy

Rationale for Assigned Level: Chose a sophisticated strategy and explained it.

Possible Next Steps: Model and explain other mental math strategies.

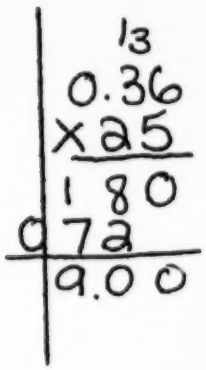
Exemplar 2 of 2



Competency: Student uses a variety of strategies to calculate and explain a mental math problem.

Description of the Task: Calculate 36% of 25.

Not Meeting **MID-GRADE 7 LEVEL OF PERFORMANCE**



Rationale for Assigned Level: Resorts to the algorithm.

Possible Next Steps: Help the student become familiar with benchmarks that will help mental calculation.

Approaching MID-GRADE 7 LEVEL OF PERFORMANCE

50% x 25 = 12.5
25% x 25 = 6.25
10% x 25 = 2.5
1% x 25 = 0.25
9.0

Rationale for Assigned Level: Uses a good strategy but could have used the commutative property for this question.

Possible Next Steps: Review the commutative property with the student.

Meeting MID-GRADE 7 LEVEL OF PERFORMANCE

36% of 25
= 25% x 36

and $\frac{1}{4}$ of 36
is 9

Rationale for Assigned Level: Understands and explains the mental math strategy used.

Possible Next Steps: Develop the use of other benchmarks.

Resources Supporting Mathematics

Online Resources

Manitoba Education, Citizenship and Youth

<www.edu.gov.mb.ca/ks4/assess/myreporting.html>

Activities

Number and operations, geometry and measurement, functions and algebra, probability and data analysis:
<www.shodor.org/interactivate/activities/>
(In Number and operations, see Fraction Pointer and Fraction Sorter)

A large selection of activities involving a multitude of topics:
<nlvm.usu.edu/en/nav/category_g_3_t_1.html>

Decimals, fractions, integers, multiplications, factors, square roots, measurement, geometry, patterning, algebra, data management and probability:
<www.cemc.uwaterloo.ca/wired_math/english/grade7.shtml>

Activities related to number sense, place value, fractions, percentages and algebraic thinking:
<www.nald.ca/FULLTEXT/numboost/cover.htm>

Fractions, decimals, percentage – Trevor Calkins:
<www.poweroften.ca/>

Resources

Winnipeg School Division:
<www.wsd1.org/PC_Math/>

Ontario – Department of Education:
<www.edu.gov.on.ca/eng/document/reports/numeracy/panel/index.html>

Reproducible Materials

Blackline Masters (BLMs):
<lrt.ednet.ns.ca/PD/BLM/table_of_contents.htm>

Exemplars

New Zealand:
<www.tki.org.nz/r/assessment/exemplars/maths/index_e.php#fractions>

British Columbia:
<www.bced.gov.bc.ca/perf_stands/numeracy.htm>

Ontario:
<www.edu.gov.on.ca/eng/curriculum/elementary/math.html>

Australia:
<k6.boardofstudies.nsw.edu.au/maths/>

Other Interesting Sites

Ellie's (Grade 7) Math Blog:
<www.grade7math.blogspot.com>

Visual Fractions:
<www.visualfractions.com>

National Security Agency:
<www.nsa.gov/teachers/es/frac63.pdf>

Kids Konnect.com:
<www.kidskonnect.com/MathSites/MathSites.html>

Math.com
The World of Math Online:
<www.math.com/homeworkhelp/HotSubjects_integers.html>

321 Know Math:
<www.321know.com/equ.htm>

Lawrence Township Public Schools:
<www.lawrence.k12.nj.us/staff.cfm?subpage=8572>

Amby's Brain Games and Thinking Skill Enhancers:
<amby.com/go_ghoti/thinking.html>

Jefferson County Schools:
<208.183.128.8/basic/math.html>

Woodland Hills School District:
<www2.whsd.k12.pa.us/EJ/Teachers/kritde/Math_Plus_files/InteractiveIndex.htm>

John W. Gunn Middle School:
<www.jwg.retsd.mb.ca/mathhelp.html>

Funbrain:
<www.funbrain.com/fract/index.html>

Print Resources

Manitoba Education and Training. *Grades 5 to 8 Mathematics: A Foundation for Implementation.* Winnipeg, MB: Manitoba Education and Training, 1997.

Manitoba Education, Citizenship and Youth. *Developing Conceptual Understanding of Number.* <www.edu.gov.mb.ca/ks4/cur/math/>. 6 Jun. 2006.

Manitoba Education, Training and Youth. *Grade 5 to 8 Mathematics: Classroom-Based Assessment.* Winnipeg, MB: Manitoba Education, Training and Youth, 2001.

Hope, Jack A., Barbara J. Reys, and Robert E. Reys. *Mental Math in the Middle Grades.* Palo Alto, CA: Dale Seymour Publications, 1987.

Van de Walle, John, and Sandra Folk. *Elementary and Middle School Mathematics—Teaching Developmentally.* Canadian ed., Boston, MA: Pearson/Allyn & Bacon, 2005.

Van de Walle, John, and LouAnn H. Lovin. *Teaching Student-Centered Mathematics—Grades 5-8.* Montreal, QC: Pearson/Allyn & Bacon, 2006.

SECTION 4:
REPORTING RESULTS

Overview of the Reporting Process *53*
Sending Results to Parents *53*
Sending Results Data to the Department *54*
Student Performance below the Lowest Levels Described in the Competency Criteria *54*
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Reporting Results to the Public *56*

REPORTING RESULTS

Overview of the Reporting Process

The summative student performance information, which is for reporting, is derived from a classroom-based assessment process in which students and teachers work collaboratively to clarify and set learning goals and to monitor and discuss progress to promote student learning. The reported level of performance for each student on each competency identified in the policy is made relative to the criteria provided in the reporting templates found in Section 3, and is based on each student's furthest point of advance **as of the last two weeks of January***.

Sending Results to Parents

Reporting templates provided by the Department are used for communicating results to parents. Samples of the templates are provided in Section 3 of this document. As detailed in the Manitoba Education, Citizenship and Youth policy document *Middle Years Assessment of Key Competencies in Mathematics, Reading Comprehension, Expository Writing, and Student Engagement*, these reports are to be sent home "in a timely manner" as determined by local discretion. A report is to be sent home for all students in the associated grade regardless of their status in the classroom, except in cases where exemptions have been approved.

These reporting templates may also be used to communicate information to parents and students at other times, and may be used in classrooms to assist in monitoring and documenting ongoing progress relative to the competencies.

Schools or school divisions wishing to incorporate reporting for this policy into other reporting procedures, rather than use the reporting templates in Section 3, must first obtain authorization from Manitoba Education, Citizenship and Youth.

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* French Immersion schools with a late immersion program may choose to base the report of Grade 7 students in *Mathématiques* on the **first two weeks of March**.

Sending Results Data to the Department

Results data (not the reports to parents themselves) are to be sent to the Department by the end of February*. Schools will receive a letter each fall describing the procedures for reporting data to the Department. This data will be communicated to the Department on a student-by-student basis and will be based on students enrolled in Grade 7 and Grade 8 in the school according to September 30th enrollment data. Procedures for adding new students and removing students no longer enrolled will be provided.

Student Performance below the Lowest Levels Described in the Competency Criteria

If a student's late-January performance level is below the lowest level described in the reporting template for a given competency, then no performance levels should be indicated in the report to parents but an explanation should be made in the comment section.

For reporting data to the Department, an option will be provided for each competency to indicate that the student is performing below the lowest performance level for the competency.

Student Performance above the Highest Levels Described in the Competency Criteria

If a student's performance is above the highest level described in the reporting template for a given competency, then the highest level of performance should be indicated in the report. A comment may be made in the comment section of the reporting template (to parents) to explain.

Students with Exceptional Circumstances

In rare instances it will not be possible to report results to parents or to the Department as required by this policy due to "exceptional circumstances." For example, the student might have arrived in the province in January with no performance information available. Such a student may be exempted from the reporting process provided the parents are informed, they give consent, and the school makes a request that includes the details of the circumstances to the Department by the end of January.

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* French Immersion schools with a late immersion program opting to report student results for *Mathématiques* relative to the first two weeks of March can report results to the Department by the end of March.

The format of the request letter is shown below:

> Re: Middle Years Assessment Policy—Exceptional Circumstances Exemption Request
>
> Include: School name; Student name and MET number*; description of the exceptional circumstances; statement that the parent approves of the exemption; school contact person with title, telephone number, and signature.

The request may be mailed or sent by fax as follows:

English Program:
Instruction, Curriculum and Assessment Branch
71-1567 Dublin Avenue
Winnipeg MB R3E 3J5
Fax: (204) 948-2442

Français or French Immersion Program:
Bureau de l'éducation française
Direction des services de soutien en éducation (Section Évaluation)
509-1181 Portage Avenue
Winnipeg MB R3G 0T3
Fax: (204) 948-3234

Once the exemption from reporting is granted by the Department:

- no reporting to the parents is required
- reporting to the Department is required, with the exemption indicated in the report and no performance levels for any of the competencies reported

Students with an Individual Education Plan (IEP)

- **Reporting to parents:** A check box is provided in the reporting template for use when the IEP relates to the competencies addressed in the policy**. Performance levels in the associated competencies need not be indicated if the student is working below the lowest level in the reporting template according to the IEP. A comment should be made in the comment box.

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* Inquiries regarding MET numbers should be made to the Professional Certification and Student Records Unit at 1 800 667-2378.

** In the context of this policy and associated report, the IEP would reflect special learning needs related to the competencies as documented in the plan. Students with special learning needs that are not related to the competencies participate in the same assessment and reporting as their peers. Information about IEPs is available at <www.edu.gov.mb.ca/ks4/specedu/iep/>.

- **Reporting to the Department:** A method to indicate the IEP will be provided. It will be presumed that the student's performance relative to the competencies is below the lowest levels described in the reporting template. If, however, the student's performance of any competency is within the levels of performance in the report, this information should be provided.

English as an Additional Language Students and *Phase d'accueil, Bloc intensif* Students

This includes cases where the student's status as an additional-language learner has an impact on performance results.

- **Reporting to parents:** The report should not indicate the levels of performance if the student is working below the lowest level in the reporting template due to the student's language learning status. A comment should be made in the comment box.
- **Reporting to the Department:** A method to indicate this situation will be provided. It will be presumed that the student's performance relative to the competencies is below the lowest levels described in the reporting template. If, however, the student's performance of any competency is within the levels of performance in the report, this information should be provided.

Reporting Results to the Public

Schools and school divisions report to the public in the manner described in the Manitoba Education, Citizenship and Youth policy document *Middle Years Assessment of Key Competencies in Mathematics, Reading Comprehension, Expository Writing, and Student Engagement:* "Schools and school divisions/districts are to include an analysis of school/school division level results in their report to the community, along with appropriate contextual background information" (8). The Department will provide provincial, divisional, and school summaries to school divisions and independent schools.

SECTION 5:
USING SUMMATIVE ASSESSMENT DATA

Classroom *59*
School and School Division *59*
Province *59*

USING SUMMATIVE ASSESSMENT DATA

Although the January reports are summative, the data generated from them can be used to inform future educational decisions in support of Middle Years learners.

Classroom

At the classroom level, teachers, students, and parents can use the data as additional information to set goals and monitor progress over time. Particularly if students are having difficulty in one or more of the competencies, special attention by the teacher, support teachers, parents, and the students is necessary to address any newly identified areas of concern or to continue support for the student.

Teachers can also use this summative data for formative purposes by involving students in reflecting on work samples and on their progress to date. Through this process, students are also involved in setting appropriate short- and long-term goals for the remainder of the school year.

School and School Division

The data sent by schools will be summarized by the Department and returned to schools and school divisions. Because these reports are based on descriptors and exemplars for each level of performance, schools will be provided with reliable year-to-year information on how well their students are performing in the key competencies in language arts and mathematics. This data can be used to inform decisions on how best to support Middle Years learners, and to identify areas of strength or concern and possible professional development priorities or resources at the school and divisional levels.

Province

The provincial summary of the data will provide a snapshot of how students are performing province-wide. Analyzing and reflecting on this summary of the data each year will influence future policies and decisions about how best to support Middle Years learners.

SECTION 6:
REFERENCES

REFERENCES

Leahy, Siobhan, Christine Lyon, Marnie Thompson, and Dylan Wiliam. "Classroom Assessment: Minute by Minute, Day by Day." *Educational Leadership* 63.3 (November 2005): 18-25.

Manitoba Education, Citizenship and Youth. *Middle Years Assessment of Key Competencies in Mathematics, Reading Comprehension, Expository Writing, and Student Engagement.* Winnipeg, MB: Manitoba Education, Citizenship and Youth, 2006.

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